Amendments to the Specification

Please replace paragraph **[0053]** with the following rewritten paragraph:

[0053] The adhesive applying apparatus 14 will be first described. The adhesive applying apparatus 14 includes a dispenser unit 30 which is movable in the XY plane, that is, along the mutually perpendicular X-θaxis and Y-axis directions. The upper surface of the printed-wiring board 16 is a working surface 32 parallel to the XY plane. The dispenser unit 30 is moved to a plurality of predetermined coating positions on the working surface 32, so that the dispenser unit 30 applies the adhesive agent to predetermined fluid-applying spots corresponding to the coating positions. For moving the dispenser unit 30 in the XY plane, two feedscrews 34 are disposed on the opposite sides of the PWB conveyor 20, so as to extend in the X-axis direction, and so as to be spaced apart from each other in the Y-axis direction, as shown in Fig. 1. The two feedscrews 34 are held in meshing engagement with respective two nuts 38 (shown in Fig. 2) fixed to an X-axis slide 36, and are rotated by respective X-axis drive motors 40 (shown in Fig. 1), in synchronization with each other, so that the X-axis slide 36 is moved in the X-axis direction. As shown in Fig. 2, the machine base 10 has two guiding members in the form of guide rails 42 formed under the respective two feedscrews 34, while the X-axis slide 36 has two guide blocks 44 which slidably engage the respective guide rails 42, so that the movement of the X-axis slide 36 is guided by the guide rails 42 and guide blocks 44, which cooperate with each other to constitute a guiding device.

A1

Please replace paragraph **[0055]** with the following rewritten paragraph:

[0055] The dispenser unit 30 will then be described. The dispenser unit 30 is vertically movable on the Y-axis slide 52, toward and away from the printed-wiring board 16. To this end, the Y-axis slide 52 is provided with a pair of guiding members in the form of guide rails (not shown) extending in the vertical direction, and a Z-axis slide 70 which

A2

slidably engage the guide rails through guide blocks (not shown). The Z-axis slide 70, which carries the dispenser unit 30, is moved in the vertical direction by a Z-axis drive device 72. In the present embodiment, the Z-axis drive device 72 includes as a drive source a fluid-operator actuator in the form of an air cylinder 74 serving as a fluid-operated cylinder. The ~~Z0axis~~ Z-axis drive device 72 further includes a piston rod 76 which is connected to the Z-axis slide 70 and is moved by the air cylinder 74. With a vertical movement of the piston rod 76, the Z-axis slide 70 is vertically moved to move the dispenser unit 30 in the vertical direction toward and away from the working surface of the printed-wiring board 16. In the present embodiment, the air cylinder 74 is provided with a restrictor mechanism for restricting an air flow into an air chamber thereof when its piston has been moved to a position close to the stroke end, so that the Z-axis slide 70 can be slowed down and stopped at its stroke end. The Z-axis slide 70 and the Z-axis drive device 73 cooperate to constitute an elevator device 78 serving as a relative-movement device operable to move the dispenser unit 30 and the object in the form of the printed-wiring board 16 relative to each other in the vertical direction perpendicular to the working surface 32. The elevator device 78 also serves as a nozzle elevator device operable to move a one-point coating delivery nozzle 90 (described below) of the dispenser unit 30 in the vertical direction. On the other hand, the XY robot 60 serves as a nozzle moving device operable to move the delivery nozzle 90 in the XY plane parallel to the working surface 32 of the printed-wiring board 16. In the present embodiment, the Z-axis slide 70 constitutes a body of the adhesive applying apparatus 14, while the XY robot 60 and the Z-axis drive device 72 cooperate to constitute a relative-movement device operable to move the Z-axis slide 70 and the printed-wiring board 16 relative to each other in the vertical direction perpendicular to the working surface 32. The elevator device 78 may use as its drive source an electric motor in the form of a servomotor for moving the dispenser unit 30 in the vertical direction.

A2 cont'd

Please replace paragraph **[0060]** with the following rewritten paragraph:

[0060] The drive gear 118 is supported by the Z-axis slide 70 through bearings 126, such that the drive gear 118 is rotatable about its vertically extending axis, while the driven gear 120 is supported by the Z-axis slide 70 through a bearing 128, such that the driven gear 120 is rotatable about its vertically extending axis. The driven gear 120 is held in meshing engagement with the drive gear 118, and the ring member 122 is coaxially fixed to the driven gear 120. The sleeve 124 has a cylindrical shape, and extends through the ring member 122. The sleeve 124 is fitted in a through-hole 130 formed through the driven gear 120 in the axial direction such that the sleeve 124 is axially movable relative to the driven gear 120. The sleeve 124 has a radially outwardly extending flange portion 134, while the ring member 122 has a radially inwardly extending ~~flag~~ <u>flange</u> portion 136. The sleeve 124 is supported at its flange portion 134 by the underlying flange portion 136 of the ring member 122, so that the sleeve 124 is prevented from moving downwards. The flange portion 134 is held in engagement with a pin 138 which is fixed to the flange 136 so as to extend in the axial direction of the ring member 122. This arrangement prevent a rotary motion of the sleeve 124 relative to the ring member 122, but permits an axial motion of the sleeve 124 relative to the ring member 122. Thus, the pin 138 serves as a relative-rotation preventing device for preventing relative rotation of the sleeve 124 and the ring member 122, and a rotary-motion transmitting device for transmitting the rotary motion between the sleeve 124 and the ring member 122.

A3

Please replace paragraph **[0062]** with the following rewritten paragraph:

[0062] As described above, the delivery nozzle 90 is ~~removable~~ <u>removably</u> attached to the nozzle rotating device 92, and thus serves as a nozzle holding device for holding the delivery nozzle 90. Although Fig. 3 shows the delivery nozzle 90 attached to the nozzle rotating device 92, two or more different kinds of delivery nozzle may be selectively attached

A4

to the nozzle rotating device, for coating the printed-wiring board 16 with the adhesive agent. For instance, a second embodiment of this invention uses a multiple-point delivery nozzle in the form of a two-point coating delivery nozzle 160 having two delivery tubes 162, which may be attached to the nozzle rotating device 92, as shown in Fig. 4, in place of the one-point coating delivery nozzle 90. The two delivery tubes 162 are disposed on the delivery nozzle 160, at respective two radial positions which lie on a circle having a center on the axis of a nozzle body 164 and which are opposed to each other in a diametric direction of the nozzle body 164. The nozzle body 164 has two passages 166 formed therethrough so as to extend in the axial direction, and the two delivery tubes 162 are fixedly fixed in the lower end portions of the respective two passages 166. The two delivery tubes 162 are identical in construction with each other, extending in parallel with each other, for delivering the same amount of adhesive agent onto the printed-wiring board 16. The upper end portions of the two passages 166 are formed as tapered passages 168 whose diameter linearly increases in the upward direction away from the delivery tube 162 and which communicate with a common passage 170 which is formed coaxially through the nozzle body 164 and which has a relatively large diameter. The nozzle body 164 further carries a pin 172 which coaxially extends downwards from its lower end face such that the lower end of the pin 172 is located a suitable distance below the lower end of the two delivery tubes 162. Like the pin 110, the pin 162 serves as a gap-defining portion.

A4 cnt'd

Please replace paragraph **[0069]** with the following rewritten paragraph:

[0069] The rotary shaft is rotated by a screw rotating device 96, which includes a drive source in the form of a screw drive motor 240 disposed on the Z-axis slide 70 such that its output shaft extends in the axial direction of the rotary shaft 230. In the present embodiment, the screw drive motor 240 <u>is</u> a rotary electric motor in the form of a servomotor. A rotary motion of the screw drive motor 240 is transmitted to the rotary shaft 230 through a

A5

A5 cnt'd

joint 242, and the screw 214 is rotated with a rotary motion of the rotary shaft 230 about its vertically extending axis.

Please replace paragraph **[0104]** with the following rewritten paragraph:

A6

[0104] In the present embodiment, the solenoid-operated shut-off valve 274 is held in the open state to introduce the compressed air into the air chamber of the container 250, for pressurizing the adhesive agent in the container 250, at least while the adhesive agent is delivered from the delivery nozzle 90 onto the board 16. Accordingly, the supply passages 260, 262, and a helical space between the screw 214 and the inner circumferential surface of the screw chamber 210 are filled with the adhesive agent, without air cavities, so that a rotary motion of the screw 214 causes the adhesive agent to be fed through the helical portion 218 to the delivery port 222, and further fed from the delivery port 222 into the tapered passage 109 of the nozzle body 104. The adhesive mass within the passage 108 is extruded through the delivery tube 106, and delivered onto the working surface 32 of the board 16. The adhesive agent having a relatively high degree of viscosity is fed by the rotating screw 214 to the delivery port 222, and the amount or volume of the adhesive mass to be ~~delivery~~ delivered onto the board 16 can be accurately controlled according to the rotating angle of the screw 214.

Please replace paragraph **[0116]** with the following rewritten paragraph:

A7

[0116] When the adhesive mass has been applied to all of the predetermined number of adhesive-applying spots in the large-amount coating mode, an affirmative decision (YES) is obtained in step S68, and the control flow goes to step S69 to set the LARGE-AMOUNT COATING COMPLETION flag to the ON state, and reset the second counter, the COATING-CONDITION ADJUSTMENT DETERMINATION flag, etc. In the next cycle of execution of the routine, therefore, an affirmative decision (YES) is obtained in step S61, and the control flow goes to steps S70-S78 to ~~take~~ apply the adhesive agent in the medium-

amount coating mode, take the images of the applied adhesive masses, calculate the actual delivery amount of the adhesive mass and effect a determination as to whether the calculated actual delivery amount in the medium-amount coating mode is substantially equal to the desired value. If the actual delivery amount is insufficient or excessively large, the angle data representative of the operating angle of the screw drive motor 204 are stored in a MEDIUM DELIVERY-AMOUNT memory. Then, steps S79-S85 are implemented to apply the adhesive agent in the small-amount coating mode, and effect processing operations similar to those in the large- and medium-amount coating modes described above. When the coating operation in the small-amount coating mode has been performed at all of the predetermined number of adhesive-applying spots, the control flow goes to step S86 to set the first and second COATING COMPLETION flags to the ON state, reset the second counter, COATING-CONDITION ADJUSTMENT DETERMINATION flag, etc., and update the angle data stored in the first memory area of a SMALL DELIVERY-AMOUNT memory.

A7 cont'd

Please replace paragraph **[0118]** with the following rewritten paragraph:

[0118] In the first-board coating routine of Figs. 11 and 12, the determination in steps S66, S75 and S83 as to whether the actual delivery amount of the adhesive mass is substantially equal to the desired value is effected when the count C2 has exceeded the predetermined value CB, more precisely, has increased to a sum (CB + 1). However, the determination in steps S66, S75 and S83 may be effected immediately after the coating operation has been performed at all of the predetermined number (CB) of adhesive-applying spots. For instance, step S63 is followed by step S66. If the negative decision (NO) is obtained in step S66, the control flow first goes to step S65t, and then to a step to determine whether the count C2 has reached the predetermined value CB. If the count C2 has reached the predetermined value CB, the control flow goes to step S67 to determine whether the actual delivery amount is substantially equal to the desired value, and then to step S69 to set

A8

A8 cnt'd

the LARGE-Amount COATING completion flag to the ON state. Subsequently, steps S61-S63, S66, S68 and S69 are repeatedly implemented without implementation of steps S65, S67, until the count C2 has reached the predetermined value C1.

Please replace paragraph **[0132]** with the following rewritten paragraph:

[0132] It will be understood from the foregoing descriptions of the first and second embodiments that the CCD camera 332 and a portion of the control device 350 assigned to implement steps S65, S74, S82, S107, S123 and S138 cooperate to constitute a delivery-amount detecting device operable to detect an amount of an adhesive agent delivered from the delivery nozzle 90, 160 onto the printed-wiring board 16. It will also be understood that the screw rotating deice ~~92~~96, a portion of the control device 350 assigned to implement steps S67, S76, S84, S111, S115, S127, S131, S142 and S146, and the RAM 356 cooperate to constitute a pump control device operable to control the screw drive motor 240 of the screw pump 94 according to the angle data which are stored in the LARGE, MEDIUM and SMALL DELIVERY-AMOUNT memories and which represent the rotating angle of the screw 214. It will further be understood that a portion of the control device 350 assigned to implement step S201 constitutes a nozzle-rotation control device operable to control the nozzle rotating device ~~98~~92, and that the heating and cooling devices 296, 298 and a portion of the control device 350 assigned to implement step S2 cooperate to constitute a gas-temperature control device which is operable to control the temperature of the compressed gas to be introduced into the air passage 294 and which cooperates with the air passage 294 to constitute the temperature control device 290 operable to control the temperature of the adhesive agent within the pump chamber 210 and the delivery nozzle 90, 160.

A9

Please replace paragraph **[0145]** with the following rewritten paragraph:

A10

[0145] Described in detail, the syringe 600 is connected to a compressed-air supply device (not shown) through a pipe joint 656 and a hose (not shown). When the screw pump

602 is operated, the syringe 600 is supplied with compressed air, so that the compressed air assists the screw pump 602 to ~~delivery~~ deliver the adhesive agent. Owing to the ~~direction~~ direct connection of the screw pump 602 to the syringe 600, a resistance to a flow of the adhesive agent from the syringe 600 to the screw pump 602 is relatively low, and the amount of elastic deformation of the adhesive agent is relatively small, permitting the supply of the adhesive agent ~~to the~~ from the syringe 600 to the screw pump 602 immediately after the supply of the compressed air to the syringe 600 is initiated, and permitting the termination of the supply of the adhesive agent to the screw pump 602 immediately after the supply of the compressed air is stopped. The pump control device indicated above is arranged to rotate the screw pump 602 in the reverse direction by a predetermined angle when the screw pump 602 is turned off. This arrangement permits an accurate control of the amount of delivery of the adhesive agent from the delivery nozzle 624.

A10 cnt'd